1. (Amended) A *Thermotoga maritima* (*Tma*) DNA polymerase mutant which is modified at least [one way] two ways selected from the group consisting of:

(a) to reduce or eliminate the 3'→5' exonuclease activity of the polymerase;

(b) to reduce or eliminate the 5'→3' exonuclease activity of the polymerase; and

(c) to reduce or eliminate discriminatory behavior against a dideoxynucleotide.

Please add the following new claims:

-- 37. An isolated DNA molecule encoding a *Thermotoga maritima* (*Tma*) DNA polymerase mutant which is modified at least two ways selected from the group consisting of:

(a) to reduce or eliminate the 3'→5' exonuclease activity of the polymerase;

(b) to reduce or eliminate the 5'→3' exonuclease activity of the polymerase; and

(c) to reduce or eliminate discriminatory behavior against a dideoxynucleotide.

38. A mutant *Tma* DNA polymerase having a mutation resulting in said DNA polymerase becoming non-discriminating against dideoxynucleotides, or a fragment of said mutant DNA polymerase said fragment having polymerase activity.

39. The mutant *Tma* DNA polymerase of claim 38, wherein said polymerase comprises a mutation in the O-helix of said DNA polymerase.

40. The mutant *Tma* DNA polymerase of claim 39, wherein said O-helix is defined as RXXXKXXXFXXXYX, wherein X is any amino acid.

41. The *Tma* polymerase of claim 40, wherein said mutation is a $Phe^{730} \rightarrow Tyr^{730}$ substitution.

42. A method of synthesizing a double-stranded DNA molecule comprising:

(a) hybridizing a primer to a first DNA molecule; and

(b) incubating said DNA molecule in the presence of one or more deoxy or dideoxyribonucleoside triphosphates and the DNA polymerase of claim 38, under conditions sufficient to synthesize a second DNA molecule complementary to all or a portion of said first DNA molecule.

43. A method of amplifying a double stranded DNA molecule, comprising:

(a) providing a first and second primer, wherein said first primer is complementary to a sequence at or near the 3'-termini of the first strand of said DNA molecule and said second primer is complementary to a sequence at or near the 3'-termini of the second strand of said DNA molecule;

(b) hybridizing said first primer to said first strand and said second primer to said second strand in the presence of a DNA polymerase of claim 38, under conditions such that a third DNA molecule complementary to said first strand and a fourth DNA molecule complementary to said second strand are synthesized;

(c) denaturing said first and third strand, and said second and said fourth strand; and

(d) repeating (a) to (c) one or more times.

Rwt DC

44. A method of sequencing a DNA molecule, comprising:

(a) hybridizing a primer to a first DNA molecule;

(b) contacting said DNA molecule of step (a) with dexyribonucleoside triphosphates, a DNA polymerase of claim 38, and a terminator nucleotide;

(c) incubating the mixture of step (b) under conditions sufficient to synthesize a random population of DNA molecules complementary to said first DNA molecule, wherein said synthesized DNA molecules are shorter in length than said first DNA molecule and wherein said synthesized DNA molecules comprise a terminator nucleotide at their 5' termini; and

(d) separating said synthesized DNA molecules by size so that at least a part of the nucleotide sequence of said first DNA molecule can be determined.--

Remarks

Reconsideration and reexamination of this Application are respectfully requested.

Claims 1-10, 13, 16, 17, 19, 26, 28, 29, and 34-44 are pending in the application. Of these pending claims, claims 7, 8, and 10 are objected to, claims 1-6, 9, 13, 16, 17, 19, 26, 28, 29, and 34-36 are rejected, and claims 37-44 are newly added. Based on the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.